4:15

812-2 Myocardial Blood Volume Decreases After Exhaustion of Autoregulation: Insights With Contrast Echocardiography

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Because of autoregulation microvessels distal to a coronary stenosis dilate in order to maintain constant myocardial blood flow (MBF). This microvessel dilation causes an increase in myocardial blood volume (MBV). The fate of MBV after exhaustion of autoregulation is not known. We hypothesized that MBV decreases after exhaustion of autoregulation and that this decrease can be measured using myocardial contrast echocardiography (MCE). Accordingly 21 dogs underwent progressive stenosis of the LAD. MBF was measured using radiolabeled microspheres. MCE was performed with a direct coronary injection of Albunex® over 1 sec and the mean microbubble transit rate was calculated from the myocardial time-intensity curves. MBV was calculated by dividing MBF by the mean transit rate. As the severity of coronary stenosis increased, the mean microbubble transit rate increased from 1.4 s^{-1} to 1.0 s^{-1} ($P < 0.05$) despite constant MBF indicating an increase in MBV. When autoregulation was exhausted (coronary perfusion pressure <45 mm Hg), a decrease in MBV (from 1.0 s^{-1} to 0.7 s^{-1} ($P < 0.05$) was noted with a decline in MBF. MBF declined more rapidly than MBV. Although the decrease in MBV was associated with a decrease in perfusion bed size (by as much as 50%) as assessed by MCE, it was also associated with a calculated drop in microvessel volume. It is concluded that MBV decreases after exhaustion of autoregulation. This new finding has important significance for coronary physiology and MCE since video intensity measurements can reflect relative MBV.

4:30

812-3 Detection of Changes in Myocardial Perfusion With Contrast Echocardiography Using Intracoronary Injections of Albunex®

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Limited experience exist with the use of Albunex® for the evaluation of myocardial perfusion in man. To assess whether myocardial contrast echocardiography (MCE) with intracoronary injection of Albunex® can detect high and low flow states in man, 15 patients (14 males; mean age, 57 ± 10) undergoing coronary angioplasty (PTCA) with perfusion catheters were studied. Albunex (3 cc; 1:2 dilution) was injected at baseline, during PTCA using perfusion catheters that permit a forward flow of 40 cc/min (FL40; n = 9) or 60 cc/min (FL60; n = 7), and after PTCA. MCE was performed using standard 2-dimensional continuous imaging. Mean % diameter stenosis pre-PTCA was 90 ± 6.9 and decreased after PTCA to <30%.

Results (background corrected intensity: *p < 0.05 vs. baseline):

	Baseline	FL40	FL60	Post PTCA
Peak Intensity	19.4 ± 6	17 ± 13	23 ± 15	28 ± 10*
Area under curve	157 ± 87	154 ± 84	145 ± 114	235 ± 151*

In 3 patients with FL40, transient dyssynergy occurred during PTCA accompanied by reduction in the MCE parameters of perfusion. The hyperemic response after PTCA was confirmed in 5 patients by Doppler flow velocities. *In conclusion,* quantitative MCE with intra-coronary injection of Albunex® is capable of detecting myocardial perfusion provided through perfusion catheters during PTCA, even when perfusion drops to the threshold of ischemia. In addition, MCE detects well the post PTCA hyperemic response. Albunex® is, therefore, a safe and sensitive contrast agent for intracoronary use.

4:45

812-4 Functional and Non-functional Coronary Collaterals Assessed With Myocardial Contrast Echocardiography During Acute Coronary Occlusion in Humans

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Although epicardial coronary collaterals that appear during coronary occlusion have been shown to be functionally significant, previous studies have not distinguished between the collaterals with and without cardioprotective effects. We performed coronary angiography (CAG) and myocardial contrast echocardiography (MCE) in 15 patients undergoing elective coronary angioplasty of the left anterior descending artery. The contrast material was injected into the right coronary artery before and during coronary occlusion and collaterals were graded on a 4-point scale (none = 0, to good = 3). The cardioprotective effect of coronary collaterals was assessed in terms of the degree of wall motion abnormality that developed during coronary occlusion. Both CAG and MCE detected the development of collateral filling during coronary occlusion ($p < 0.01$, $p < 0.05$, respectively). There was no significant correlation between CAG and MCE collateral grades before or after coronary occlusion. The CAG grade before or during coronary occlusion was not associated with a cardioprotective effect, but the MCE grade before ($p < 0.05$) or during ($p < 0.001$) coronary occlusion was significantly correlated with cardio-protection. Myocardial ischemia did not develop in patients with good myocardial perfusion within the occluded bed (MCE grade ≥2) during coronary occlusion but developed in all patients with poor perfusion (MCE grade ≤ 1) during coronary occlusion ($p < 0.001$). We concluded that 1) the acute protective effect of coronary collaterals was not related to angiographically determined collateral vessel filling but correlated to myocardial perfusion assessed with MCE and 2) the use of MCE to assess myocardial blood flow via collateral channels was useful to differentiate the coronary collaterals during acute coronary occlusion with and without the cardioprotective effect.

813 Coronary Disease Prevention: Influence of Gender and Race

Wednesday, March 19, 1997, 4:00 p.m.–5:00 p.m.
Anaheim Convention Center, Room A6

4:00

813-1 Gender Differences in Mortality After Acute Myocardial Infarction in the '90s, in Israel

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We studied the interrelationship between gender, age and prognosis after acute myocardial infarction (AMI) in 2010 pts (74% men) hospitalized in all 25 CCUs operating in Israel, in a prospective nationwide survey conducted during Jan–Feb in '92 and in '94. The pts were stratified by gender and 2 age groups: <65 and ≥65 yrs. *Results:* Among pts <65 yrs, women (W) were older than men (M) (56 vs 53 yrs, $p < 0.01$), but not among pts ≥65 yrs (74 vs 73 yrs). In both age groups, diabetes and hypertension were more common in W, while prior MI and smoking were more frequent in M. Medical therapy was similar in M and W in both ages. Thrombolysis, coronary angio, PTCA and CABG performed during hospital stay were performed with similar frequency in both genders in both age groups. 7-day, 7-day to 6-month and 6-month cumulative crude mortality rates and the multivariate adjusted mortality odds-ratios (OR) of W compared to M were (Table):

Mortality	<65 yrs			≥65 yrs		
	M (n = 850)	W (n = 165)	OR (95% CI)	M (n = 637)	W (n = 358)	OR (95% CI)
7-day	3.5%	7.9%	1.86 (0.83–4.13)	8.9%	16.2%	2.13 (1.38–3.28)
7-day to 6-month	3.7%	5.3%	2.18 (1.15–4.13)	14.8%	12.7%	0.71 (0.46–1.12)
6-month cumulative	7.1%	12.7%	2.18 (1.15–4.13)	22.5%	26.8%	1.15 (0.82–1.61)

Conclusion: In Israel in the '90s, W aged <65 yrs had an independent worse early- and 6-month prognosis after AMI. At older age (≥65) W fare worse than M only early after AMI, but not after discharge from hospital.

4:15

813-2 Sex Differences in Coronary Hospitalizations

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Unexplained sex differences in initial clinical presentation of coronary heart disease (CHD) have been described. We studied sex and other predictors of CHD hospitalizations in 56,926 men (2802 cases) and 72,008 women (1449 cases) who provided baseline data at prior health examinations. Cox proportional hazards models with 10 covariates were used to prospectively study first CHD hospitalizations. The table shows that, in both age-adjusted and multivariate analyses, male/female relative risks (RR) were substantially greater for acute myocardial infarction (AMI, code 410, n = 1757) and chronic ischemic heart disease (CIHD, codes 412, 414, n = 573) than for other acute